

CLAIMS

1. A plasma display device provided with a plasma display panel comprising a plurality of columns of discharge cells having one of a single color and multiple colors, and a phosphor layer disposed in each of the discharge cells, the phosphor layer having a color corresponding to the each discharge cell for emitting light when excited by ultraviolet rays, wherein

the phosphor layer includes a green color phosphor comprising at least one kind selected from among phosphor materials defined by general formulae of $M_{1-a} (Ga_{1-x}Al_x)_2 O_4:Mn_a$ (where "M" denotes one of Zn, Mg, Ca and Sr), $(Y_{1-a-y}Gd_a) (Ga_{1-x}Al_x)_3 (BO_3)_4:Tb_y$, $(Y_{1-a-y}Gd_a) (Ga_{1-x}Al_x)_3 (BO_3)_4:Ce_y, Tb_y$, $(Y_{1-a-y}Gd_a) BO_3:Tb_y$, and $(Y_{1-a-y}Gd_a)_3 (Ga_{1-x}Al_x)_5 O_{12}:Tb_y$.

2. A plasma display device provided with a plasma display panel comprising a plurality of columns of discharge cells having one of a single color and multiple colors, and a phosphor layer disposed in each of the discharge cells, the phosphor layer having a color corresponding to the each discharge cell for emitting light when excited by ultraviolet rays, wherein

the phosphor layer includes a green color phosphor comprising a mixture of a phosphor material defined by a general formula of $M_{1-a} (Ga_{1-x}Al_x)_2 O_4:Mn_a$ (where "M" denotes one of Zn, Mg, Ca and Sr) and one of phosphor materials defined by general formulae of $(Y_{1-a-y}Gd_a) (Ga_{1-x}Al_x)_3 (BO_3)_4:Tb_y$ and $(Y_{1-a-y}Gd_a) (Ga_{1-x}Al_x)_3 (BO_3)_4:Ce_y, Tb_y$.

3. A plasma display device provided with a plasma display panel comprising a plurality of columns of discharge cells having one of a single color and multiple colors, and a phosphor layer disposed in each of the discharge cells,

the phosphor layer having a color corresponding to the each discharge cell for emitting light when excited by ultraviolet rays, wherein

the phosphor layer includes a green color phosphor comprising a mixture of a phosphor material defined by a general formula of $M_{1-a} (Ga_{1-x}Al_x)_2 O_4 \cdot Mn_a$ (where "M" denotes one of Zn, Mg, Ca and Sr) and another phosphor material defined by a general formula of $(Y_{1-a-y}Gd_a) BO_3 \cdot Tb_y$.

4. A plasma display device provided with a plasma display panel comprising a plurality of columns of discharge cells having one of a single color and multiple colors, and a phosphor layer disposed in each of the discharge cells, the phosphor layer having a color corresponding to the each discharge cell for emitting light when excited by ultraviolet rays, wherein

the phosphor layer includes a green color phosphor comprising a mixture of a phosphor material defined by a general formula of $M_{1-a} (Ga_{1-x}Al_x)_2 O_4 \cdot Mn_a$ (where "M" denotes one of Zn, Mg, Ca and Sr) and another phosphor material defined by a general formula of $(Y_{1-a-y}Gd_a)_3 (Ga_{1-x}Al_x)_5 O_{12} \cdot Tb_y$.

5. The plasma display device according to one of claim 1 to claim 4, wherein values "a" and "x" in the general formula of $M_{1-a} (Ga_{1-x}Al_x)_2 O_4 \cdot Mn_a$ (where "M" denotes one of Zn, Mg, Ca and Sr) are within ranges of $0.01 \leq a \leq 0.06$ and $0.1 \leq x \leq 1$ respectively.

6. The plasma display device according to one of claim 1 and claim 2, wherein values "a", "x" and "y" in any of the general formulae of $(Y_{1-a-y}Gd_a) (Ga_{1-x}Al_x)_3 (BO_3)_4 \cdot Tb_y$ and $(Y_{1-a-y}Gd_a) (Ga_{1-x}Al_x)_3 (BO_3)_4 \cdot Ce_y, Tb_y$ are within ranges of $0 \leq a \leq 1$, $0.1 \leq x \leq 1$ and $0.02 \leq y \leq 0.4$ respectively.

7. A plasma display device provided with a plasma display panel comprising a plurality of columns of discharge cells having one of a single color and multiple colors, and a phosphor layer disposed in each of the discharge cells, the phosphor layer having a color corresponding to the each discharge cell for
5 emitting light when excited by ultraviolet rays, wherein

the phosphor layer includes any of a green color phosphor, a blue color phosphor and a red color phosphor,

the green color phosphor comprises one of a spinel group phosphor, a yttria group phosphor and a mixture of the spinel group phosphor and the yttria
10 group phosphor,

the blue color phosphor comprises one of phosphor materials of $\text{Ba Mg Al}_{10} \text{O}_{17}:\text{Eu}$ and $\text{Ba Sr Mg Al}_{10} \text{O}_{17}:\text{Eu}$, and

the red color phosphor comprises one of phosphor materials of $\text{Y}_2 \text{O}_3:\text{Eu}$ and $(\text{Y, Gd})\text{BO}_3:\text{Eu}$.